EL RIO EXTENSION

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

SURVEY REPORT

Surveyor's Certification

This report represents a ground control survey for control of aerial Photography performed under my direct supervision.

Daniel K Mardock, RLS 37174

SURVEY SUMMARY

RBF Consulting performed a ground control survey for the FCD El Rio Extension. Field surveys were carried out during the first week of March of 2006. RBF field crews worked under the direct supervision of Daniel K. Mardock, RLS 37174. The RBF project number for this project is 45-102996.

The horizontal survey data in this project is presented in State Plane Coordinates, North American Datum of 1983 (NAD 83) 1992 epoch, and Arizona Central Zone, International Foot. Elevations are referenced to the North American Vertical Datum of 1988 (NAVD88), International Foot. All survey measurements were made in the published datum for the survey control used, NAD 83(1992) NAVD88.

Horizontal control

This survey was tied to geodetic control monuments established by the Maricopa County Department of Transportation (MCDOT). These points were observed by MCDOT between 1998 and 2000 as a part of their Geodetic Densification and Cadastral Survey (GDACS) project. The horizontal positions of these monuments have been accepted by the National Geodetic Survey (NGS) and given a horizontal order of B. The published values are related to NAD83 (1992). Ties were made to monuments 4AE1 (PID AJ3826) and 3BD3 (PID AJ3817).

Vertical control

The same monuments that were used for horizontal control have a vertical component provided by MCDOT. The elevations were established by determining an ellipsoidal height by GPS observation and referencing to NAVD88. The orthometric height was then determined using a high-resolution geoid model (geoid 99) with precise GPS observation and processing techniques. The NGS publishes these results as Third Order Class II ellipsoidal heights.

Outline of survey procedures

One half-inch rebar 18 inches long were set at the center of thirty-six aerial targets. Twenty-eight of them were set for project control. The other eight were quality control blind panels. A GPS base station was set up on 4AE1 and an observation was made to 3BD3 to verify a match to control datum. At each of the aerial targets 2 GPS observations were made on the set rebar. Each observation was made under an independent initialization. The results of the two observations were analyzed to see that any difference between them was within tolerance. The observations were then merged to generate one coordinate value for the target. The values of the twenty-eight control panels were delivered to Vertical Mapping Resources for use in controlling the photogrametry. The values of the other eight panels were delivered to the Flood Control District of Maricopa County for use in verifying the quality of the mapping.

Fieldwork was preformed using Trimble 5000 series receivers (5700 and 5800). Zypher antennas were used where external antennas were needed. All antennas used collect L1/L2 and p-code. These antennas are designed to help eliminate multipath and unwanted noise from the observation data. Trimmark III radios were used for RTK work. Trimble Geomatics Office version 1.62 software was used to process field data.

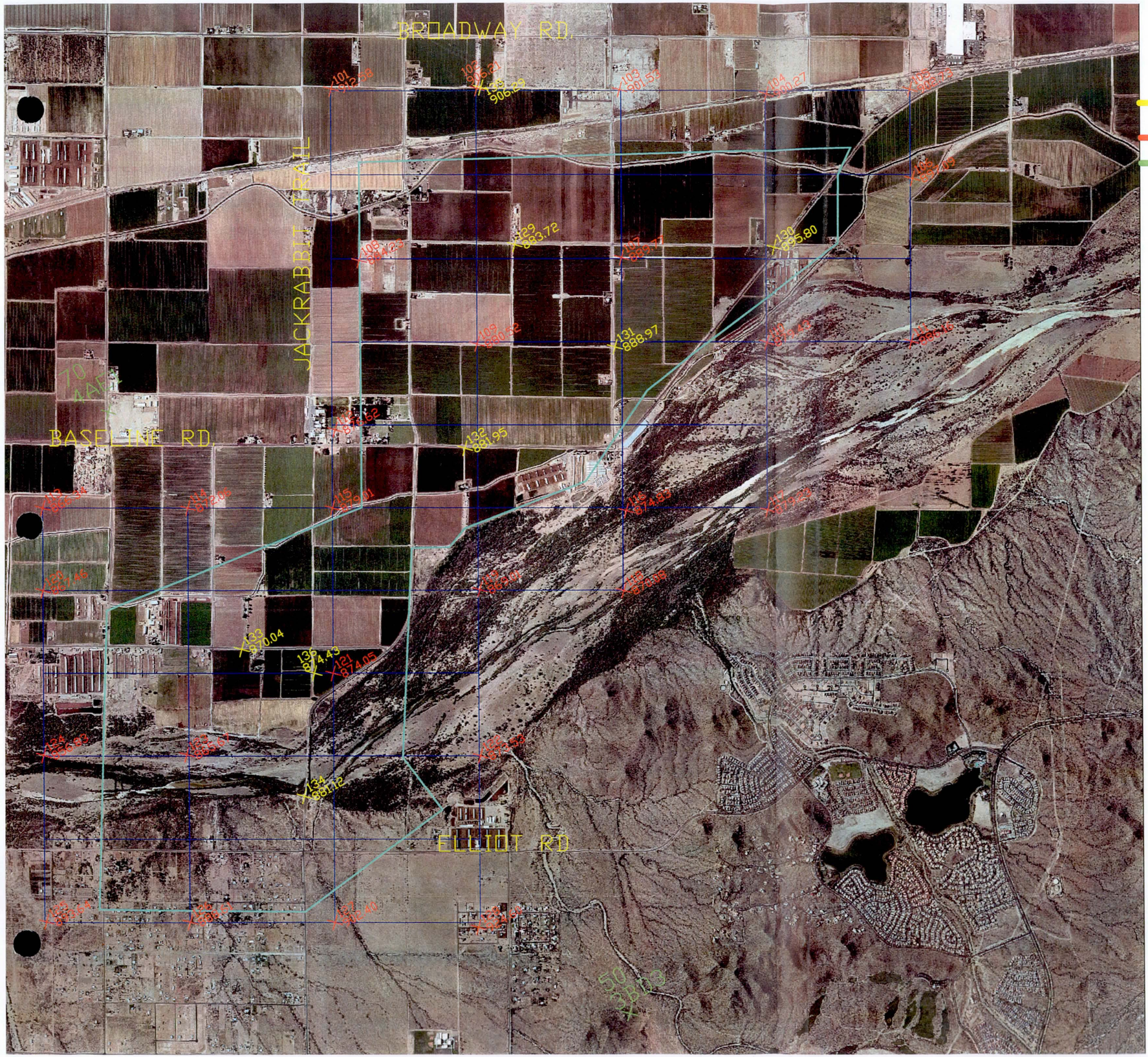
FCD El Rio Extention.
Ground control panels.
State Plane AZ Central (NAD 83/92) HARN. NAVD 88.
Based on GPS observations on NGS control stations 4AE1 and 3BD3.
RBF Consulting, 3-10-06, DK Mardock RLS 37174, 602-467-2200 dmardock@rbf.com

Name	Norhting	Easting	Elevation	Description
101	874584.40	526538.96	912.58	AT1 REBAR
102	874599.10	530332.75	906.21	AT 2 REBAR
103	874561.66	534051.60	901.53	AT 3 REBAR
104	874472.13	537889.27	900.27	AT 4 REBAR
105	874563.41	541643.74	902.73	AT 5 REBAR
106	872280.40	541703.91	897.09	AT 6 REBAR
107	870242.98	534085.58	889.77	AT 7 REBAR
108	870176.19	527252.82	884.23	AT 8 REBAR
109	868005.43	530307.35	880.52	AT 9 REBAR
110	868052.60	537877.88	879.43	AT 10 REBAR
111	868072.48	541661.71	886.16	AT11 REBAR
112	865776.02	526599.86	876.62	AT 12 REBAR
113	863738.88	518969.49	866.34	AT 13 REBAR
114	863736.20	522750.42	872.06	AT 14 REBAR
115	863731.66	526528.19	879.02	AT 15 REBAR
116	863658.95	534180.22	874.83	AT 16 REBAR
117	863680.41	537875.25	879.23	AT 17 REBAR
118	861572.52	534105.56	870.08	AT 18 REBAR
119	861599.10	530346.86	869.01	AT 19 REBAR
120	861578.41	518967.12	867.46	AT 20 REBAR
121	859413.53	526522.05	874.05	AT 21 REBAR
122	857260.35	530339.16	873.53	AT 22 REBAR
123	857293.47	522689.11	865.67	AT 23 REBAR
124	857276.78	518963.58	856.83	AT 24 REBAR
125	852956.32	519011.56	893.64	AT 25 REBAR
126	852953.32	522755.33	888.61	AT 26 REBAR
127	852938.94	526525.62	902.40	AT 27 REBAR
128	852816.64	530257.25	924.60	AT 28 REBAR

FCD El Rio Extention.
Quality Control "Blind" panels
State Plane AZ Central (NAD 83/92) HARN. NAVD 88
Based on GPS observations on NGS control stations 4AE1 and 3BD3.
RBF Consulting, 3-10-06, DK Mardock RLS 37174, 602-467-2200 dmardock@rbf.com

Name	Northing	Easting	Elevation	Description
129	870582.51	531296.82	883.72	AT 29 REBAR
130	870525.58	538087.75	895.80	AT 30 REBAR
131	867928.69	533906.93	888.97	AT 31 REBAR
132	865292.38	529974.41	881.95	AT 32 REBAR
133	860043.78	524133.56	870.04	AT 33 REBAR
134	856214.08	525751.04	881.12	AT 34 PK NAIL
135	874617.61	530433.01	906.29	DEA target#44.
136	859416.65	526034.13	874.43	AT 21 REBAR

Point #'s 129-134 are the six blind panels originally planned.
Point# 135 is a panel set by others within 150ft of our panel.
Point# 136 was set as a precaution when we could not get into the field where one of the control panels landed. We did gain access and set the panel prior to flight.


BROADWAY RD.
JACKRABBIT TRAIL
BASELINE RD.
ELLIOT RD
BLIND PANELS
CONTROL PANELS
PRIMARY CONTROL